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two orders, of which BERNARD has collected and described 202. Of these 4 are new to Java, 79 others are new to the East Indian region, and 81 are described as new species or varieties. By 580 carefully drawn figures, rather crowded on the plates, the author represents all species of his collection, so that later workers can see what plants he has actually been working with. The evident care and thoroughness of the work indicate that this is no mean contribution to the knowledge of the Javenese flora.—C. R. B.

Folk names of Brazilian plants.—For some years there has been running through the *Pharmaceutical Review* a series of articles by Dr. THEODOR PECKOLT, giving the vernacular names of Brazilian plants and plant products, including both the Portuguese names and those adopted from the Tupi language. This material is now brought together in book form,[3] as monograph no. 15 of the Pharmaceutical Science Series, under the editorship of Dr. EDWARD KREMERS. The vernacular names appear in alphabetic order, with the German equivalent where it exists, the scientific equivalent, including the specific name and family name, when known, and brief comments in German on the use made of the products. It is rather unfortunate that there is not an index to the scientific names, for this would undoubtedly greatly increase the usefulness of what has been a difficult and time-consuming task. The volume will be of special assistance to taxonomists, to dealers in crude drugs, and to manufacturers who call for Brazilian products.—C. R. B.

German South-polar Expedition.—The second part of the eighth volume (Botany) of the sumptuous report upon this expedition has just been issued,[4] with an account by REINBOLD of all the seaweeds except the Lithothamniaceae, which are elaborated by FOSLIE. The collections were not extensive and no new species were found by REINBOLD. FOSLIE, however, recognized and described several new unsegmented corallines from the material obtained by this expedition, and here presents again the descriptions with photographic illustrations.—C. R. B.

NOTES FOR STUDENTS

A primitive type of seed.—OLIVER has made a most interesting contribution[5] to our knowledge of the structure of paleozoic seeds. In 1875 WILLIAMSON described *Physostoma elegans* from the Lower Coal-measures, but a little later placed it in his new genus Lagenostoma as *L. physoides*. OLIVER now proposes to revive the genus Physostoma as distinct from Lagenostoma, replacing the name *L. physoides* by the original *P. elegans*, and associating with it ARBER'S *L. Kidstonii* as *P. Kidstonii*.

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[3] PECKOLT, THEODOR, Volksbenennungen der brasilianischen Pflanzen und Produkte derselben in brasilianischer (portugiesischer) und von der Tupisprache adoptirten Namen. 8vo. pp. 252. Milwaukee: Pharmaceutical Review Publishing Co. 1907.

[4] Deutsche Südpolar-Expedition, 1901–1903, im Auftrage des Reichsamtes des Innern herausgegeben von ERICH VON DRYGALSKI, Leiter der Expedition. VIII. Band, Botanik, Heft II. (1) REINBOLD, TH., Die Meeresalgen, pp. 179–202. (2) FOSLIE, M., Die Lithothamnien. pp. 203–220. *pl. 20. figs. 1–6.* Berlin: Georg Reimer. 1908. *M* 5.

[5] OLIVER, F. W., On *Physostoma elegans* Williamson, an archaic type of seed from the Palaeozoic rocks. Annals of Botany **23**:73–116. *pls. 5–7. figs. 10.* 1909.

Physostoma elegans is remarkable in several particulars. It is a small (5.5–6^{mm}), narrow, usually ten-ribbed seed, with the integument free only in the region of the nucellar beak, as in Lagenostoma; but in this free region the integument consists of ten distinct lobes ("tentacles" the author calls them). These lobes are the direct prolongation of the ribs below, and represent the units of the "canopy" of Lagenostoma. Both lobes and ribs are clothed with long, club-shaped hairs. The testa shows no stony layer, and therefore is homogeneous, consisting of five or six layers of close-fitting, thin-walled, elongated cells. The vascular system enters the narrowed base of the seed as a single strand, which at once breaks up into a ring of strands, each one of which traverses a rib and continues on through the corresponding free lobe. The vascular strands lie along the inner limit of the integument, in what would be the "inner fleshy layer" had the usual three-layered differentiation of the testa occurred. On the outside of each strand there is a lacuna; and in the base of the seed a continuous lacuna surrounds the single large strand and the group of separating strands. It is suggested that these lacunae represent the position of disorganized phloem.

The nucellus is remarkable in its peripheral "secretory zone," which extends from the chalaza to the tip of the nucellar beak. The "secretory sacs" are thin, oblong, tabular cells, separated by a tissue of smaller cells. They are most abundant and crowded in the funnel-shaped region of the chalaza bounded by the diverging vascular strands and the base of the embryo sac. The author sees in the presence of these secretory sacs the retention in the ovule of a feature present in the vegetative organs, in which character Physostoma is unique in the Lagenostoma group. Between the secretory zone and the sac there is a tissue of six or more radially compressed layers, which the author calls the "tapetum." Of course this may represent the active nutritive zone developed in many gymnosperms in the nucellar tissue surrounding the sac; or it may be the ordinary nucellar tissue compressed by the enlarging sac. The megaspore membrane was only occasionally detected, and then as a very delicate one. The pollen chamber, as in Lagenostoma, is formed by the separation of the epidermis of the nucellar beak from the subjacent tissue, giving the appearance of nucellar tissue growing into the pollen chamber as a conical mass, the chamber thus becoming a bell-shaped crevice. Physostoma differs, however, from Lagenostoma, in the fact that the embryo sac invades this beak, so that the apex of the sac is invested by the base of the pollen chamber ("like the incurved bottom of a wine bottle"). OLIVER suggests that this apical prolongation of the sac of Physostoma may be the "primordial tent pole," as found in Cordaitales and Ginkgoales.

The pollen chambers contain an abundance of pollen grains, which show the cell-complex now known in several paleozoic seeds. The author thinks that at least the larger of these cells produced sperms, and asociated bodies, probably representing sperms, were also found.

The author concludes that an integument of free segments is more primitive than that of "coalesced" segments, and that probably intermediate stages of coalescence occur in the Lagenostoma group. In this group, therefore, the origin of the integument is multiple, but the nature of the units is the residual question. OLIVER is not inclined to accept Miss BENSON'S suggestion that the integument (as illustrated by that of *Lagenostoma Lomaxii*) has arisen by the sterilization of the peripheral sporangia of a synangium; but prefers to regard it as a new structure, arising contemporaneously with the seed habit, and related in some way to the "encasement" that so often accompanies reproductive activity.

The reasons for regarding Physostoma as a member of the Lagenostoma group are given in detail, and the conclusion is reached that it is the "most primitive seed yet come to light," the plant to which it belongs probably being one of the Lyginodendreae. The reasons for the conclusion quoted above are not quite clear, and seem to contradict some rather convincing conclusions reached by the same author in his study of Stephanospermum and other paleozoic seeds.—J. M. C.

Sterility in hybrids.—TISCHLER[6] has a lengthy treatment of the subject of sterility in hybrids. A preliminary paper, summarizing his conclusions, has already been reviewed in this journal.[7] The present paper is in two parts, the first presenting the cytological data and the second dealing with the theoretical conclusions. The use of charcoal in drawings can scarcely be recommended for clearness, many of the figures being mere smudges, and they furnish no sufficient evidence of such cytological matters as the pairing of threads in synapsis. Pollen formation, and in some cases megaspore formation, is described in hybrids of Mirabilis, Potentilla, and Syringa. A variety of irregularities, such as are common during the reduction divisions in hybrids, are described, including formation of extra nuclei by chromosomes left in the cytoplasm and failure of one or both reduction mitoses. In other cases the reduction processes were normal, but there was a lack of cytoplasm and the pollen grains failed to grow. *Potentilla rubens*, cultivated in dry and hot conditions, matured good pollen, but after fertilization the young embryos died. In all cases a paucity of cytoplasm was observed, beginning during or after reduction.

TISCHLER concludes that the cause of sterility is not any lack of harmony between the chromatic elements. However, it seems necessary to assume some "incompatibility" of the chromatins or plasms, which makes itself evident during the formation of reproductive cells, for otherwise there is no explanation why a plant continues to show vegetative growth and yet fails to mature its germ cells. Instead of a chromosome incompatibility, perhaps we may have in the

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[6] TISCHLER, G., Zellstudien an sterilen Bastardpflanzen. Arch. Zellforschung **1**:33–151. *figs. 120.* 1908.

[7] BOT. GAZETTE **45**:68. 1908.